198 Time and handling of the I-Neb in target inhalation mode (TIM) and tidal breathing mode (TBM) assessed in mild to severe CF patients

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Objectives: For effective treatment of CF with inhaled drugs, efficient, easy to use devices are needed. This study was designed to assess time and practicability of Alpha-1-Antitrypsin (A_1-PI(H)), (77 mg/1.1 ml) lung deposition in CF patients.
Methods: Using the Respironics I-Neb AAD System. 15 mild to severe CF patients (FEV_1: 34–101%) were included to inhale study drug in two inhalation modes: Target Inhalation Mode (TIM) and Tidal Breathing Mode (TBM).
Conclusion: Total inhalation time was lower in TIM (3±0.5 min) than in TBM (4.5±2.1 min). Inhalation time and volume inhaled per breath were lower in TBM than in TIM. Subjects inhaled more deeply and slowly in TIM. Consequently, treatment time was longer and the number of breaths needed to deliver a similar dose was higher in TBM than in TIM. In both inhalation modes a high percentage of CF subjects rated their mouthpiece exhalation as "easy" and "very easy" (TIM: 80%, TBM: 100%). In total, 87% of the CF subjects classified their mouthpiece inhalation through in TBM as "easy" and "very easy" (TIM: 40%). For both inhalation modes a high percentage of CF subjects classified the use of the I-neb as "easy" and "very easy" (TIM: 71.5%, TBM: 86.7%).
All CF patients were able to inhale the full dose in <6 min in TIM and <10 min in TBM. TIM is consistently more efficient and less time consuming than TBM, as reflected in total treatment and inhalation time, and number of breaths. All CF patients could handle the device properly and most of them rated its use as easy or very easy.

199 Early predictors of bronchiectasis and trapped air severity in cystic fibrosis

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Objective: Bronchiectasis (BE) and trapped air (TA), detected by chest computed tomography (CT) are important determinants of cystic fibrosis (CF) lung disease. We aimed to identify early predictors of BE and TA severity in children with CF.
Methods: Single center longitudinal study. Inclusion: CF patients with two routine bi-annual volumetric CTs, at least 5 years apart, aged 6–13 years at CT_1. CTs were anonymized and scored with CF-CT scoring system (% maximum score). Predictors tested in univariate models are: socio economic status, FEV_1 at CT_1, *Pseudomonas* ever before CT_1, pulmonary exacerbations (iv antibiotic courses in year prior to CT_1), BE and TA scores at CT_1. Stepwise multivariate modeling was used to identify independent predictors.
Results: Twenty-seven patients were studied, median age 9.2 (6.9–12.9) years, median time interval between CTs 6.5 (5.8–7.9) years. Children with *Pseudomonas* ever had 7.91 (95% confidence interval 2.26–13.58) % higher BE score at CT_2 ($p < 0.01$). An exacerbation prior to CT_1 resulted in a 22.4 (1.64–43.2) % higher TA score at CT_2 ($p = 0.04$). A 1% increase on BE score at CT_1 resulted in a 1.04 (0.67–1.41) % higher BE score at CT_2 ($p < 0.01$). A 1% increase on TA score at CT_1 resulted in a 1.57 (0.06–3.08) % higher TA score at CT_2 ($p = 0.04$). Multivariate analysis showed that the BE score on CT_1 remained predictive for BE ($p < 0.01$) and TA ($p = 0.04$) at CT_2.
Conclusion: *Pseudomonas* or exacerbation prior to CT_1 predicted BE and TA at CT_2 (median) 6.5 years later. This effect appeared to be mediated through BE at CT_1, which was predictive of BE and TA severity 6.5 years later.
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200 Is sweat chloride predictive for severity of cystic fibrosis (CF) lung disease assessed by chest computed tomography (CT)?

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Background: CF lung disease is characterized by poor genotype–phenotype correlation. Sweat chloride level is a functional marker of the CF Transmembrane Regulator protein and could be a predictor of the severity of CF lung disease.
Objective: To study correlations between sweat chloride and bronchiectasis (BE), trapped air (TA) and mucus plugging on chest CT.
Methods: Retrospective analysis. Inclusion: Availability of sweat chloride at time of diagnosis and of at least one routine in- and expiratory spirometry-controlled volumetric chest CT scan. CT scans were de-identified and randomized (Myrian® Montpelier, Fr) and scored using the CF-CT scoring system (%max). Intra- and interobserver variability: intraclass correlation coefficient. Associations between sweat chloride-levels and CF-CT subscores: Pearson's correlation coefficient and multivariate regression models. Effect modification age CT-scan tested by stratification. Descriptives: expressed as median (range).
Results: 69 Children (34 male), age sweat chloride 0.8 (0–19.5) years, age chest CT 13.8 (5.5–19) years, TA score 6.5 (0–25.5) %max and BE score 2 (0–24.3) %max. Univariate analysis CF-CT scores vs sweat chloride (ns). Multivariate models adjusting for age of sweat test and CT scan: significant association between sweat chloride and CF-CT BE ($p = 0.036$) and mucus plugging ($p = 0.027$). Stratification in tertiles for age of CT scan showed that association was present only in the oldest age group (range 15–19 years).
Conclusion: Sweat chloride levels are predictive of long term CF lung disease as determined by chest CT, the association was primarily determined by children older than 15 years.

201 CT findings in cystic fibrosis diagnosed in adulthood

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Objectives: To describe the HRCT findings in patients with CF diagnosed in adulthood and to correlate them with clinical and functional data; to describe usefulness of additional pancreas CT study.
Methods: We reviewed the HRCT at the time of diagnosis of 52 patients (range 18–72 years) with CF diagnosed in adulthood. We analysed the pulmonary findings according to the Brody scoring system, considering presence, severity and symmetry and distribution of bronchiectasis, mucous plugs, bronchial wall thickening, bubbles, emphysema, atelectasis, and mosaic pattern. The radiological features were correlated with lung function. In 33 patients in which the CT study was extended to the pancreas, we assessed the degree of pancreatic fatty replacement and correlated it with functional status.
15 patients had a normal HRCT study (28.8%). The other 37 patients had lesions with very different severity. Bronchiectasis with mucous plugs were present in all patients; the disease had a symmetrical distribution in 29/37 patients; in 11/37 patients the upper lung was more severely affected. Correlation between radiological score and functional tests (FEV1) resulted statistically significant ($p < 0.01$; $r = 0.87$). In 19/33 patients (57.6%) a fatty replacement of the pancreas was observed; it was partial in 11 cases and total in 8; only 4 patients with total fatty replacement showed exocrine pancreatic dysfunction.
Conclusion: At HRCT severity of pulmonary involvement in patients with CF diagnosed in adulthood is extremely variable. While the exocrine function is still normal, CT can detect structural abnormalities of the pancreas suggesting that it is not too late to consider the diagnosis of CF.